Exelon Generation

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United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Byron Station, Unit 1
Facility Operating License No. NPF-37
NRC Docket No. STN 50-454

Subject: Licensee Event Report (LER) 454-2014-003-00, "Byron Unit 1 Diesel Generator Actuation due to System Auxiliary Transformer (SAT) 142-2 Relay Actuation and Loss of Off-site Power (LOOP)"

Enclosed is Byron Station Licensee Event Report (LER) No. 454-2014-003-00 regarding the Byron Station Emergency Diesel Generators (DGs) auto-start following Station Auxiliary Transformer electrical feed lockout and Byron Unit one Loss of Off-site Power. This condition is reportable to the NRC in accordance with 10 CFR 50.73(a)(2)(iv)(A), "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section."

There are no regulatory commitments in this report.

Should you have any questions concerning this submittal, please contact Mr. Steven Gackstetter, Regulatory Assurance Manager, at (815) 406-2800.

Respectfully,

Faber A. Kearney
Site Vice President
Byron Generating Station

FAK/GC/sg

Enclosure: LER 454-2014-003-00

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Byron Generating Station

NRC FORM 366 (02-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

# LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

| 1. FACILITY NAME | 2. DOCKET NUMBER | 3. PAGE |
|---|---|---|
| Byron Station, Unit 1 | 05000454 | 1 OF 3 |

**4. TITLE**

Byron Unit 1 Diesel Generator Actuation due to System Auxiliary Transformer 142-2 relay actuation and Loss of Off-site Power (LOOP).

| 5. EVENT DATE | | | 6. LER NUMBER | | | 7. REPORT DATE | | | 8. OTHER FACILITIES INVOLVED | |
|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV NO. | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | N/A | N/A |
| 03 | 15 | 2014 | 2014 | 003 | 00 | 05 | 14 | 2014 | FACILITY NAME: N/A | DOCKET NUMBER: N/A |

| 9. OPERATING MODE | 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)* | | | |
|---|---|---|---|---|
| 6 | ☐ 20.2201(b) | ☐ 20.2203(a)(3)(i) | ☐ 50.73(a)(2)(i)(C) | ☐ 50.73(a)(2)(vii) |
| | ☐ 20.2201(d) | ☐ 20.2203(a)(3)(ii) | ☐ 50.73(a)(2)(ii)(A) | ☐ 50.73(a)(2)(viii)(A) |
| | ☐ 20.2203(a)(1) | ☐ 20.2203(a)(4) | ☐ 50.73(a)(2)(ii)(B) | ☐ 50.73(a)(2)(viii)(B) |
| | ☐ 20.2203(a)(2)(i) | ☐ 50.36(c)(1)(i)(A) | ☐ 50.73(a)(2)(iii) | ☐ 50.73(a)(2)(ix)(A) |
| **10. POWER LEVEL** | ☐ 20.2203(a)(2)(ii) | ☐ 50.36(c)(1)(ii)(A) | ☒ 50.73(a)(2)(iv)(A) | ☐ 50.73(a)(2)(x) |
| | ☐ 20.2203(a)(2)(iii) | ☐ 50.36(c)(2) | ☐ 50.73(a)(2)(v)(A) | ☐ 73.71(a)(4) |
| 000 | ☐ 20.2203(a)(2)(iv) | ☐ 50.46(a)(3)(ii) | ☐ 50.73(a)(2)(v)(B) | ☐ 73.71(a)(5) |
| | ☐ 20.2203(a)(2)(v) | ☐ 50.73(a)(2)(i)(A) | ☐ 50.73(a)(2)(v)(C) | ☐ OTHER |
| | ☐ 20.2203(a)(2)(vi) | ☐ 50.73(a)(2)(i)(B) | ☐ 50.73(a)(2)(v)(D) | Specify in Abstract below or in NRC Form 366A |

**12. LICENSEE CONTACT FOR THIS LER**

| LICENSEE CONTACT | TELEPHONE NUMBER *(Include Area Code)* |
|---|---|
| Steven A Gackstetter – Manager, Byron Regulatory Assurance | (815) 406-2800 |

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

| CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX |
|---|---|---|---|---|---|---|---|---|---|
| B | EB | IS | N/A | Y | N/A | N/A | N/A | N/A | N/A |

| 14. SUPPLEMENTAL REPORT EXPECTED | 15. EXPECTED SUBMISSION DATE | MONTH | DAY | YEAR |
|---|---|---|---|---|
| ☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO | | | | |


ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On March 15, 2014, at 1102 hours, Byron Station Unit 1 experienced a Loss of Off-site Power (LOOP) event. The event occurred during refuel outage B1R19 with Unit 1 in Mode 6 during reactor core offload activities. Both Unit 1 Emergency Diesel Generators (DGs) auto-started and re-energized the safety related buses as designed. During the activity, the plant received a System Auxiliary Transformer (SAT) differential relay actuation that initiated a trip and lockout of the Unit 1 SAT feed breakers, thereby resulting in a Unit 1 LOOP with subsequent DG auto-start. This condition is reportable to the NRC in accordance with 10 CFR 50.73(a)(2)(iv)(A), "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section".

The most probable cause of the LOOP with subsequent DG auto-start was a combination of equipment failures involving a faulty test switch that caused a charge to build up in the energized-open circuit and a subsequent electrical discharge when an over-current relay was reinstalled.

**NARRATIVE**

A. Plant Condition Prior to Event

Event Date/Time: March 15, 2014 / 1102 hours CST
Unit 1 - Mode 6 - Refueling, Reactor Power 0 percent
Reactor Coolant System: Ambient Conditions

B. Description of Event

On March15, 2014, at 1102 hours, Byron Station Unit 1 experienced a Loss of Off-site Power (LOOP) event. The event occurred during refuel outage B1R19 with Unit 1 in Mode 6 during reactor fuel offload activities. Both Unit 1 Emergency Diesel Generators (DGs) auto-started and re-energized the safety related buses as designed. Coincident to the LOOP, Operational Analysis Department (OAD) technicians were performing relay calibrations for the Station Auxiliary Transformer (SAT) buses in accordance with approved work instructions. During the activity, the plant received a SAT differential relay actuation that initiated a trip and lockout of the Unit 1 SAT feed breakers, thereby, resulting in a Unit 1 LOOP with subsequent DG auto-start.

OAD personnel observed that the SAT differential relay trip occurred during the installation of the over-current relay. A potential faulty test switch caused a charge to build up in the energized-open circuit. An electrical discharge occurred when the over-current relay was inserted, resulting in a trip of a differential relay and lockout of the SAT feed breaker.

C. Cause of Event

The cause of the LOOP with subsequent DG auto-start was indeterminate. The most probable cause was a combination of equipment failures involving a faulty test switch that caused a charge to build up in the energized-open circuit. There was a subsequent electrical discharge when an over-current relay was inserted in the circuit, thereby tripping one of the differential relays and locking out the SAT feed breaker.

D. Safety Significance

This event is not considered an event or condition that could have prevented fulfillment of a safety function.

A Risk Management deterministic review/judgment concluded that there were no actual safety consequences to this event. For potential accident conditions, it is normally assumed that a LOOP occurs and that the DGs supply the safety related buses. This assumption bounds the event that occurred. The 1A and 1B DGs started and performed their safety function as designed. The Unit 1 safety related buses could have been powered by their respective DGs or the Unit 2 safety related buses, which were also capable of being powered by either their offsite sources or their respective DGs.

# LICENSEE EVENT REPORT (LER)
## CONTINUATION SHEET

| 1. FACILITY NAME | 2. DOCKET | 6. LER NUMBER | | | 3. PAGE |
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**NARRATIVE**

E. Corrective Actions

Troubleshooting was performed and offsite power was restored to Byron Unit 1 safety related Buses 141 and 142 on March 15, 2014 at 2033 and 2115 hours respectively. The Diesel Generators were shutdown per approved procedures following restoration of normal safety related bus configuration.

F. Previous Occurrences

1. Licensee Event Report (LER) 455-2012-001-00, "Unit 2 Loss of Normal Offsite Power and Reactor Trip and Unit 1 Loss of Normal Offsite Power Due to Failure of System Auxiliary Transformer Inverted Insulators," dated March 30, 2012. This LER involved an actuation of the Emergency DGs following loss of offsite power when switchyard porcelain insulators failed.

2. Licensee Event Report (LER) 455-2012-001-00, "Unit 2 Manual Reactor Trip During power Ascension Due to Steam Generator Level Approaching Turbine Trip Setpoint Caused by an Overly Complex Startup Procedure, " dated April 6, 2012. This LER involved a Unit 2 manual reactor trip and Auxiliary Feedwater System actuation.

3. Licensee Event Report (LER) 455-2013-001-00, "Unit 2 Manual Reactor Trip Due to Loss of Main Generator Stator Cooling Water," dated may 17, 2013. This LER involved the actuation of the reactor protection system following manual trip of the Unit 2 reactor.

4. Licensee Event Report (LER) 454-2014-001-00, "0A Essential Service Water (SX) Makeup Pump Unexpected Auto Start during 0B SX Pump Monthly Surveillance, dated March 24, 2014. This LER involved the auto-actuation of the 0A SX Make-up Pump while lowering water level in the 0B SX Cooling Tower basin.

A review of these LERs concluded that the causes and corrective actions taken would not have been expected to prevent this event.